

CLAIMS

What is claimed is:

- 1 1. A method of retrieving and storing quality of service policy management
2 information using a directory service, comprising the steps of:
3 receiving a validity period value of one of a plurality of directory information
4 trees that are created and stored in the directory service in association with
5 a directory information tree manager;
6 when quality of service policy management information is needed, determining
7 which one of the directory information trees is a currently active directory
8 information tree;
9 retrieving the quality of service policy management information from the
10 currently active directory information tree only during a time period
11 within the validity period value thereof.
- 1 2. A method as recited in Claim 1, further comprising the steps of designating one of
2 the directory information trees as the currently active directory information tree
3 only when all read operations and write operations are complete with respect to
4 that directory information tree.
- 1 3. A method as recited in Claim 1, further comprising the steps of providing, in the
2 directory information tree manager, a reference to one or more old directory
3 information trees for use by a reading process that specifically requests retrieval
4 of obsolete quality of service policy information that is associated with the one or
5 more old directory trees.
- 1 4. A method as recited in Claim 1, further comprising:
2 creating and storing a validity designation value in association with each directory
3 information tree, in which the validity designation value indicates whether
4 the directory information tree is active, old, or to be erased;

5 retrieving the quality of service policy management information from one
6 directory information tree that has a validity designation value of “active,”
7 and only during a time period within the validity period value thereof.

1 5. A method as recited in Claim 1, further comprising the steps of deleting an
2 obsolete directory information tree only after its validity period has expired.

1 6. A method as recited in Claim 4, further comprising the steps of testing the validity
2 designation value after carrying out a read operation, and verifying validity of
3 information that has been read by determining whether the validity designation
4 value is currently null.

1 7. A method as recited in Claim 1, further comprising the steps of determining that
2 one or more objects in a directory information tree has been modified by a process
3 and rewriting to the directory service only selected units of the directory
4 information tree.

1 8. A method as recited in Claim 1, wherein each directory information tree
2 comprises a policy sub-tree that includes one or more role objects, one or more
3 service template objects, and one or more policy decision point objects, and
4 further comprising the steps of determining that one or more objects in one of the
5 directory information trees has been modified by a process and rewriting to the
6 directory service only such objects, service template objects, and policy decision
7 point objects as have been modified by the process.

1 9. A method of retrieving and storing quality of service policy management
2 information using a directory service, comprising the steps of:
3 receiving a name and creation time value associated with one of a plurality of
4 directory information trees that are stored in the directory service in
5 association with a directory information tree manager;
6 receiving quality of service policy information from the one of the plurality of
7 directory information trees;

8 determining whether the name or creation time value of the one of the plurality of
9 directory information trees have changed;
10 determining that the quality of service policy information is successfully retrieved
11 only when the name or creation time value of the one of the plurality of
12 directory information trees are unchanged.

1 10. A method as recited in Claim 9, further comprising the steps of
2 determining which one of the directory information trees is a currently active
3 directory information tree;
4 retrieving the quality of service policy management information from the
5 currently active directory information tree only during a time period
6 within the validity period value thereof.

1 11. A method of retrieving and storing quality of service policy management
2 information using a directory service, comprising the steps of:
3 receiving a validity period value of one of a plurality of directory information
4 trees that are created and stored in the directory service in association with
5 a directory information tree manager;
6 providing, in the directory information tree manager, an active directory
7 information tree value that references the currently active directory
8 information tree, and an old directory information tree value that
9 references a formerly active directory information tree;
10 when quality of service policy management information is needed, determining
11 which one of the directory information trees is a currently active directory
12 information tree as indicated by the active directory information tree value
13 of the directory tree manager;
14 retrieving the quality of service policy management information from the
15 currently active directory information tree only during a time period
16 within the validity period value thereof.

1 12. A method as recited in Claim 11, wherein the quality of service policy
2 information associated with each of the directory information trees comprises a
3 sub-tree of one or more quality of service policies.

- 1 13. A method as recited in Claim 11, further comprising the steps of:
2 providing a manager validity period value in the directory information tree
3 manager;
4 retrieving the quality of service policy management information from the
5 currently active directory information tree only during a time period
6 within the manager validity period value.
- 1 14. A method as recited in Claim 11, further comprising the steps of:
2 providing a unique name value and a creation time value in each directory
3 information tree;
4 retrieving the quality of service policy information from a directory information
5 tree only when its creation time value is unchanged since a previous
6 retrieval from that directory information tree.
- 1 15. A method as recited in Claim 11, further comprising the steps of:
2 after retrieving the quality of service policy information,
3 (a) determining whether the current directory information tree is still valid based
4 on its validation period value;
5 (b) determining whether the current directory information tree has changed based
6 on its name value;
7 (c) if either determination (a) or (b) is true, then deleting the retrieved quality of
8 service policy information and restarting retrieval of the quality of service
9 policy information.
- 1 16. A method as recited in Claim 11, further comprising the steps of:
2 creating and storing a sub-tree of one or more quality of service policies;
3 setting the sub-tree as inactive;
4 validating consistency and error checking the sub-tree;
5 modifying an active job value of a job manager to reference the sub-tree.

1 17. A method of retrieving and storing quality of service policy management
 2 information using a directory service, comprising the steps of:
 3 creating and storing a plurality of directory information trees that are created and
 4 stored in the directory service in association with a directory information
 5 tree manager;
 6 when quality of service policy management information is needed, determining
 7 which one of the directory information trees is a currently active directory
 8 information tree;
 9 receiving a validity period value of the directory information tree manager;
 10 if the validity period value of the directory information tree manager is currently
 11 valid, then performing the steps of:
 12 receiving a name value and a validity period value of a currently active directory
 13 information tree;
 14 retrieving quality of service policy information from the active directory
 15 information tree only during the validity period value of that active
 16 directory information tree.

1 18. A computer-readable medium carrying one or more sequences of instructions for
 2 retrieving and storing quality of service policy management information using a
 3 directory service, wherein execution of the one or more sequences of instructions
 4 by one or more processors causes the one or more processors to perform the steps
 5 of:
 6 receiving a validity period value of one of a plurality of directory information
 7 trees that are created and stored in the directory service in association with
 8 a directory information tree manager;
 9 when quality of service policy management information is needed, determining
 10 which one of the directory information trees is a currently active directory
 11 information tree;
 12 retrieving the quality of service policy management information from the
 13 currently active directory information tree only during a time period
 14 within the validity period value thereof.

- 1 19. A computer-readable medium as recited in Claim 18, further comprising the steps
2 of designating one of the directory information trees as the currently active
3 directory information tree only when all read operations and write operations are
4 complete with respect to that directory information tree.
- 1 20. A computer-readable medium as recited in Claim 18, further comprising the steps
2 of providing, in the directory information tree manager, a reference to one or
3 more old directory information trees for use by a reading process that specifically
4 requests retrieval of obsolete quality of service policy information that is
5 associated with the one or more old directory trees.
- 1 21. A computer-readable medium as recited in Claim 18, further comprising:
2 creating and storing a validity designation value in association with each directory
3 information tree, in which the validity designation value indicates whether
4 the directory information tree is active, old, or to be erased;
5 retrieving the quality of service policy management information from one
6 directory information tree that has a validity designation value of "active,"
7 and only during a time period within the validity period value thereof.
- 1 22. A computer-readable medium as recited in Claim 18, further comprising the steps
2 of deleting an obsolete directory information tree only after its validity period has
3 expired.
- 1 23. A computer-readable medium as recited in Claim 22, further comprising the steps
2 of testing the validity designation value after carrying out a read operation, and
3 verifying validity of information that has been read by determining whether the
4 validity designation value is currently null.
- 1 24. A computer-readable medium as recited in Claim 18, further comprising the steps
2 of determining that one or more objects in a directory information tree has been
3 modified by a process and rewriting to the directory service only selected units of
4 the directory information tree.

- 1 25. A computer-readable medium as recited in Claim 18, wherein each directory
2 information tree comprises a policy sub-tree that includes one or more role
3 objects, one or more service template objects, and one or more policy decision
4 point objects, and further comprising the steps of determining that one or more
5 objects in one of the directory information trees has been modified by a process
6 and rewriting to the directory service only such objects, service template objects,
7 and policy decision point objects as have been modified by the process.
- 1 26. An apparatus for retrieving and storing quality of service policy management
2 information using a directory service, comprising:
3 means for receiving a validity period value of one of a plurality of directory
4 information trees that are created and stored in the directory service in
5 association with a directory information tree manager;
6 means for determining, when quality of service policy management information is
7 needed, which one of the directory information trees is a currently active
8 directory information tree;
9 means for retrieving the quality of service policy management information from
10 the currently active directory information tree only during a time period
11 within the validity period value thereof.
- 1 27. An apparatus for retrieving and storing quality of service policy management
2 information using a directory service, comprising:
3 a processor;
4 a network interface coupled to a managed network that receives network data
5 from one or more network devices that are in the managed network;
6 one or more sequences of stored instructions accessible to the processor and
7 which, when executed by the processor, cause the processor to carry out
8 the steps of:
9 receiving a validity period value of one of a plurality of directory information
10 trees that are created and stored in the directory service in association with
11 a directory information tree manager;

